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27 December 1979

# East Europe Report

SCIENTIFIC AFFAIRS

No. 657



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## AUTOMATION OF THE DESIGN OF PRINTED CIRCUIT BOARDS

Prague SLABOPROUDY OBZOR in Czech Vol 40 No 6, Jun 79 pp 274-282

KOUTNY, PREMYSL; VINCALEK, VACLAV, Tesla Karlin, National Enterprise, Prague

[Abstract] Suitable design methods of printed circuits are based on computer techniques. Such a design method developed by Tesla for printed circuit boards used in telephone service centers is described. Because a high number of elements and of connections must be located on a small area, the accuracy of the drawing of the circuits must be very high. The use of computer programs in order to develop a design when supplied with information concerning the number and the types of the components which should be used in the circuits represents the best approach to the solution of such problems. The Tesla program solves the location of the components on the board, the shape of the circuit, location, and the size of the special openings and the characteristics of the printed circuits. The size of the boards and the types of the openings are standardized for telephone service centers. The program is based on the use of memories stored on magnetic tapes; various shapes are stored in a digital form. The computer achieves correct reading of the data by comparing the input to information stored in the memories, and by adjusting the input requirements on the basis of the stored information. Two printouts are provided and are checked against each other to find possible errors. Drilling of the holes is executed by "Poselux" or "Microdrill" drills. Two hundred and fifty boards can be designed simultaneously. The set of input data must contain information concerning the location of the object in the system, shape of the contact surface, diameter of the drilled openings, and the width of the power supply lead. Circular contact surfaces are used in the Tesla design. A 9830A Hewitt Packard computer with an operational memory of 3808 words forms the heart of the system. Tape recorder Consul 333, tape reader FS 750, typewriter Facit and mosaic printer DZM 180 complete the assembly. Drafting machine Corograph of the firm Contraves with an accuracy of recording of 0.01 mm can be connected to the assembly. Tesla designed an arrangement for photographic recording of light traces and for the reading of the

recordings. The BASIC language is used in the system. Because of the limited extent of the memory (3808 words) division of complex problems into segments is needed. The program provides for automatic storage of data, their correction and production of magnetic tapes. 20 program segments are available at present and designs of 250 boards were developed. Figures 10; tables 2; references: 1 Czech.

2743

CSO: 2402

## INDUSTRIAL ENTERPRISES IN THE FIELDS OF AUTOMATION AND COMPUTERS

Prague SDELOVACI TECHNIKA in Czech Vol 27 No 4, Apr 79 p 121

[Abstract] The article discusses reorganization of the Czechoslovak electronics industry which took place at the beginning of the year. The new organization supervising the development and industrial production of computers and automation controls is designated VHJ [economic production unit] ZAVT [expansion unknown]. It incorporates the following production centers: ZVT Banska Bystrica, formerly Tesla, Zbrojovka Brno, Plants Vyskov, Proseč and those formerly known as VHJ ZPA. The research facilities of the new organization were formed by incorporation of VUMS Prague, VUAP Prague, VUVT Zilina, Tesla Computer Research Institute and the Institute for Applied Mathematics, Prague. The new centers incorporate both Czech and Slovak centers. The products and services included in the sphere of interest of the new organization are: machines for evaluation of information, office equipment, systems and instrumentation for automatic controls, electrical measurements and recording instruments, scientific and laboratory instrumentation, pneumatic instrumentation and construction and start up of instrumentation controls. The author believes that centralization of these services will improve the quality of future services and of produced instrumentation.

2743

CSO: 2402



## SEMICONDUCTOR PRESSURE SENSORS

Prague SDELOVACI TECHNIKA in Czech Vol 27 No 2, Feb 79 pp 49-53

HRUBY, Frantisek, engineer

[Abstract] The Czechoslovak firm TESLA is marketing pressure sensors for industrial and medical applications which are based on the principle of piezoresistance in semiconductor materials and in its diffusion layers. Mechanical stresses in a definite crystallographical axis of a semiconductor monocrystal cause changes in its electrical conductivity. Tensometric membranes made of semiconducting materials allow production of miniature sensing points and reduce temperature influences on the measured values. Pressure sensors types TM510/01 and TM 610/01 are industrial types suitable for pressure ranges of up to 1000 kPa (145 psi). They can be used for both static and dynamic pressure measurements and because they convert a mechanical value to an electrical value will find wide usage in automatic control of industrial processes. Types TM510/02 and TM401/01 were developed for medical and physiological applications. They can determine pressures up to 40 kPa (5.8 psi) and are finding an application in medical electronics. They are also suitable for accurate regulations of low pressures in industrial processes. The TESLA type LDP 165 pressure sensor and LMP 102 sensor were developed for measurements of biological pressure changes. Figures 14; tables 8; references: 5 Czech

CSO: 2402

## BRIGHTNESS MODULATION WITH LED DISPLAY UNITS

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 28 No 4, Apr 78  
pp 220-221

KUEHNEL, Claus

[Abstract] A method is described for modulating the brightness of light-emitting diode (LED) display units with a pulse-width modulated supply current, utilizing the approximately linear relationship between the LED's luminous density and the d.c. flow from the diode. The method may be used in cameras to match the brightness of the focusing display to that of the object. By means of Si photodiodes or other suitable means the object's luminous density is measured as the reference parameter. A circuitry realizing the modulator on the basis of this principle, also providing temperature compensation, is described and illustrated. In it, a temperature-compensated logarithming amplifier is the major component. Delogarithming takes place before the signal is used to modulate the LED; this is accomplished with the aid of the characteristic diagram of a transistor. Compensation of the temperature dependence of the saturation current is provided by increasing the base potential of the emitter appropriately. The modulation ratio may be adjusted over a wide range. In the range of interest, there is a linear relationship between  $I_{LED}$  and the luminosity of the photodiode chip. Figures 4; references 4: 3 German; 1 Hungarian.

CSO: 2302

## TECHNICAL CHARACTERISTICS OF SZM3, SZM4, MINICOMPUTERS REPORTED

Budapest SZAMITASTECHNIKA in Hungarian Oct 79 p 4

[Article by Peter Keszthelyi: "Technical Characteristics of the SZM 3, SZM 4"]

[Text] The SZM 3 and SZM 4, belonging to the first series of the MSZR [the Uniform Minicomputer System], are compatible from below. This means that the entire architecture of the SZM 3 fits into that of the SZM 4 in such a way that the latter has all the technical possibilities of the former. In addition the instructions set of the SZM 3 constitutes a part of that for the SZM 4.

The same peripherals can be connected to both the SZM 3 and the SZM 4. The difference between the two computers is given by the difference between the two processors; the processor of the SZM 4 is suitable for faster and more complex (for example, it has a floating decimal) operations. The table provides a comparison of the two processors.

Table Comparing the SZM 3 and the SZM 4

	SZM 4	SZM 3
Word length (bits)	16	16
Number of instructions	60	74
Number of general registers	8	8
Maximal addressable storage capacity (K words)	32	128*
Operation times (seconds)		
register-register	5.0	1.2
register-memory	7.0	2.5
memory-memory	10.0	3.9
fixed decimal addition	6.3	2.9
fixed decimal multiplication	--	10.2
fixed decimal division	--	13.0
floating decimal addition	--	22.0
floating decimal multiplication	--	35.0
floating decimal division	--	52.0

jumping	4.0	2.3
subroutine call and return	10	5.0
Channel type	bus bar	bus bar
Maximum transmission speed of bus bar (K words per sec)	700	700
Switching system	multiple level priority	multiple level priority
Memory cycle time (with ferrite memory) (seconds)	1.2	1.2
Memory protection	yes	yes
Automatic restart	yes	yes
Analog Type	PDP 11/05	PDP 11/40

\* Note: With memory dispatcher

[Translator's note: It appears that the SZM 4 and SZM3 at the top of the columns may have been reversed. It appears that the Greek letter qualifying speeds in seconds has been omitted.]

All units of the SZM 3 and SZM 4--processor, memory and peripheral controls--are linked to one another via a single bus bar (see diagram). This solution has the following advantages:

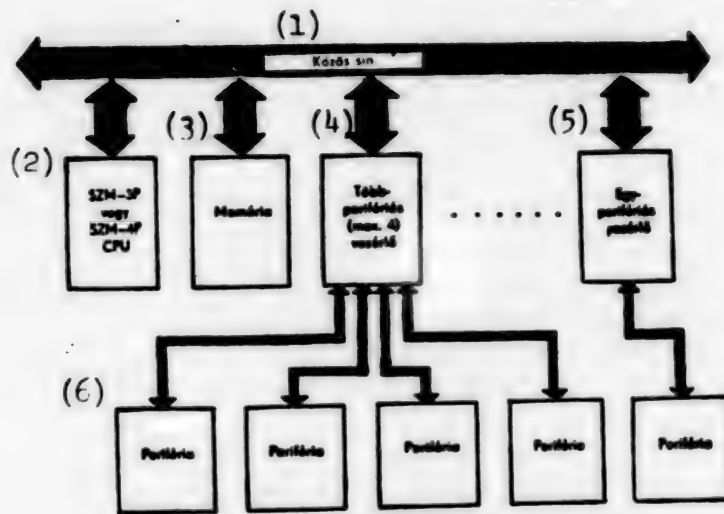
--The central unit can exchange information with any peripheral without the intervention of the memory.

--Any peripheral can exchange information with the memory without using the central unit.

--The individual peripherals can exchange information with one another without the intervention of the central unit or the memory.

--There is no need for "To Channel."

## Configuration of the SZM 3 or SZM 4



Az SZM 3, illetve az SZM 4 konfigurációja

### Key:

1. Bus bar
2. SZM-3P or SZM-4P CPU
3. Memory
4. Multi-peripheral (maximum of 4) control unit
5. Single peripheral control units
6. Peripherals

In accordance with this any piece of equipment can be the master for the bus bar and can designate that piece of equipment (slave) with which it wants to exchange information. The individual units can gain control of the bus bar in any priority for transmission of one or more units of information. With such an organization direct, high speed transmission can be realized simply and there is no need for a separate unit such as a Direct Memory Access. A maximum of 20 pieces of equipment can be connected to the bus bar.

It is a further advantage of this organization that the data buffers and other registers of the peripheral controls can be handled and addressed as parts of memory, thus with the information in the registers of the control units any operation figuring in the instruction set can be executed with a single instruction so there is no need for separate input/output instructions in the instruction set. With the SZM 3 and SZM 4 computers the "memory addresses" of the registers and buffers of the control units are located in the upper 4 K bytes of the addressable memory domain.



Requests for control on the bus bar take place with a given priority. In general requests for control connected with data transmission which does not use the CPU enjoy the greater priority. Access to memory is also possible in that the execution of instructions in the running program affects the memory cycle. But even in this case there is a memory cycle of data transmission which does not use the CPU. Of the equipment connected to the bus bar only the priority level of the CPU can be changed by the program.

The peripheral control units can request control of the bus bar not only for data transmission but also because of switching requests because switching requests also take place via the bus bar. If a peripheral control requests control for the purpose of switching the following processes take place:

--If the priority of the CPU is lower it hands over control of the bus bar.

--The peripheral control which gains control signals the switch and sends a memory address, the so-called switching vector address, to the CPU. The section designated by the switching vector address contains the initial address of the routine for switching the appropriate unit. In the section after the switching vector address one finds the new processor state (PS) word.

--The CPU stores the momentary PS and the instruction counter (PC) in temporary registers.

--The new PC and PS go to the appropriate place in the CPU and the old PS and PC go into the so-called stack or sack memory. Then the execution of the switching sub-routine begins.

Return from the switching sub-routine takes place with a single instruction and in the course of this the last PC and PS placed in the sack return to the appropriate registers of the CPU and the execution of the program proceeds accordingly. We should note that a switching sub-routine can be interrupted by a switching request with a higher priority.

By changing the priority level of the CPU--in accordance with the foregoing --one can simply achieve masking of the switchings.

The SZM 3 and SZM 4 computers have five priority levels of which the highest is that of switching which does not require the so-called processor. The various priority levels have their own query line on which the peripherals "closest" to the CPU have higher priority in accordance with stringing. In accordance with this one can develop a two dimensional priority system in the SZM 3 and SZM 4 computers.

Certain errors and program conditions cause switching. Such internal switchings are called traps. At such times the processes taking place are

identical to external switchings but the switching vector addresses are fixed. Such errors or conditions are, for example, incorrect addresses, exceeding the size of the sack, program controlled switching, loss of voltage, a HALT instruction or a STOP command from the console. Internal switchings always enjoy higher priority than external ones.

With the SZM 3 and SZM 4 computers--as we have said above--the central units are connected to the bus bar and they can define bus bar priority in addition to carrying out their "traditional" tasks (instruction decoding and arithmetic and logical operations).

Instruction execution by the CPUs is microprogrammed.

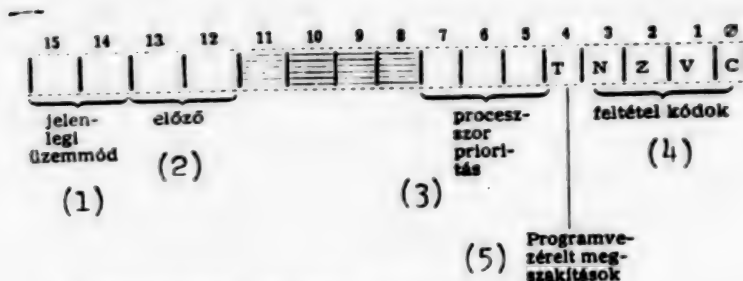
The sack (or stack) organization is very favorable from the viewpoint of handling switching and calling up sub-routines. The sack is actually a memory domain maintained by the programmer for storing return information needed for calling up sub-routines and for switching. The information stored last is always the first which can be retrieved from the sack so the sack is a Last-In-First-Out type memory. This solution makes possible the nesting of switchings and sub-routines.

The CPU contains eight general purpose registers (R0 through R7). These can be used as accumulators, index registers and registers facilitating other address processing. Register R7 is the instruction counter (PC). This also can be used for address processing, which facilitates relative addressing. The content of register R6 always indicates what part of the memory domain being used as the sack contains the feed or dump. Thus register R6 is called the sack indicator (SP).

The processor state word (PS) contains information characterizing the current state of the CPU.

The bit indicating a program controlled switching makes possible jumping to the switching sub-routine brought about by the running program. If T equals 1 then control can be handed over to the switching sub-routine. This makes it possible to look for program errors because restartable stops can be made easily at the given place.

Bits 5-7 of the PS contain the current priority level of the processor.



**A feltételkódok jelentése:**

Z = 1, a végrehajtott művelet eredménye 0.  
 N = 1, a végrehajtott művelet eredménye negatív.  
 C = 1, a végrehajtott művelet átvitelt eredményezett.  
 V = 1, a végrehajtott művelet túlsordulást eredményezett.

**Key:**

1. Present operational mode
2. Prior
3. Processor priority
4. Condition codes
5. Program controlled switchings

**Meaning of condition codes:**

Z equals 1, the result of the operation executed is 0.  
 N equals 1, the result of the operation executed is negative.  
 C equals 1, the operation executed resulted in transmission.  
 V equals 1, the operation executed resulted in an overload.

The prior and present operational modes can be indicated only on the SZM 4 computers. In the interest of facilitating multiprogramming the organization of the SZM 4 hardware makes possible two types of operational mode, an internal and a user operational mode. The operations system can make use of this possibility to prevent possible damage to the system software resulting from errors in the user programs. The user programs can be run only in the user operational mode.

The SZM 3 and SZM 4 computers are software compatible from below; that is, the programs of the SZM 3 can be run on the SZM 4 but not vice versa. One reason for this is that the instruction set of the SZM 3 represents only part of that of the SZM 4 (there are 14 fewer instructions). There are 12 address modes in the SZM 3 and SZM 4 computers:

**--Direct:**

- register,
- autoincremented,
- autodecremented,
- indexed.

--Indirect:

- indirect register,
- indirect autoincremented,
- indirect autodecremented,
- indirect indexed.

--With the PC:

- direct,
- absolute,
- relative,
- indirect relative.

The instruction set contains single address, double address, jumping, floating decimal arithmetic (only with the SZM 4) and other instructions.

8984

CS0: 2502

## HUNGARY

### MASSIVE OCCURRENCE OF A DERMATOSIS ASSOCIATED WITH DEEP NECROSIS IN SWINE STOCKS

Budapest MAGYAR ALLATORVOSOK LAPJA in Hungarian Vol 34 No 10, Oct 79  
pp 651-656 manuscript received 15 Nov 78

[Article by Dr Istvan Nothig, district veterinary, Dravafok, and Baranya Megye Animal Health Station]

[Text] In the mid 1960's, in the southern part of Baranya Megye a hitherto unknown disease appeared first in small stocks and later in large-industrial swine stocks. The first changes involved the skin followed by tissue necrosis involving the subcutaneous connective tissue and the tissues deep beneath it. Various consequences of the process could be observed. The disease caused sensitive economic losses in the stocks involved. No reference could be found anywhere in the domestic literature to a disease of similar characteristics. This is why this report is deemed worthwhile. Some similarities to the disease described here could be found only in foreign literature (Jubb, K., V., F. and Kennedy, P., C.: "Pathology of Domestic Animals" Acad. Press, New York-London, 1970). Described under the names of ulcerative granuloma and footrot, the diseases originate as skin ulcerations, followed by necrosis and granuloma formation.

The related observations are described on the basis of collecting the experiences of several colleagues, especially of Dr Laszlo Varga, veterinary at Selye, and combining them with those of the author.

#### Author's Observations

Clinical and Pathological Symptoms. In general, the disease can be traced back to some noticeable superficial or deep injury of the skin but frequently it starts without such preliminary signs. During this 1-2 day long phase, a well adhered, grayish-black, brittle scab can be seen on the skin. This covers a vivid pink base which oozes slightly when the scab is removed. Under the scab, which originally is the size of a shirt button but increases in size later, the skin becomes liquified after 1-2 more days followed by dissolution of the subcutaneous connective tissue and muscles (or other deep seated tissue) in the course of wet necrosis (picture 1). The dissolved



tissues undergo a grayish, occasionally grayish-green discoloration. Previous to dissolution, the muscles resemble boiled meat. The dissolved skin is separated from the surrounding intact skin by a translucent, greenish-white opalescent area of brittle consistency. The process spreads toward the deeper layers, and occasionally the necrotic tissues deep down have a very fetid odor, a smell resembling decayed smoked meat. In other instances they have a nauseating odor, a consistency resembling weak aspic, and are brittle. (On the basis of the characteristic appearance of the disease, the farmers refer to it as "green rot".) Between the dissolved and intact layers on the border of the deeper tissues, usually there is a 1-4 finger wide, already discolored plethoric swelling the consistency of thick dough which may be raised by about a half finger width over the surface. Later, in the course of further spreading of the process, this will also dissolve. In the areas undergoing necrosis or liquefaction later, the larger blood vessels do not dissolve or dissolve much later than the other tissues and the still functioning blood vessels appear like strings in the cavities formed within the tissues.

The tissue dissolving process advances to the bone or toward the body cavities. When started above the flat bones, the deeply invasive process stops at the surface of the flat bones and starts to spread in a circular fashion. Thus a dense, grayish-black formation 5-15 cm in diameter arises consisting of concentric layers which can be lifted like a cork from the surrounding tissues. With the exception of the cutaneous scab mentioned as the initial lesion, this is the only form not accompanied by liquefaction. The tissue dissolving process around the tubular bones can be so extensive in certain cases that it can lead to amputation of the extremity.

Frequently the extent of changes seen on the outer skin are in disproportion to the spread of changes in the deeper tissues. On the surface the "wound" may appear insignificant but inside large pouches originating from the liquefied tissues (picture 2), and branching, cave-like cavities can be found which spread under the skin, often parallel with it (for instance, between layers of the abdominal wall) forming caverns of several liters capacity (picture 3). They may extend deeply, rise toward the surface or progress in a root-like manner. Occasionally it is discovered only after the animal has succumbed, during autopsy, that a hardly noticeable, rapidly progressing process has involved a whole body area in the depths, eventually body cavities have opened or the intestines have prolapsed. Because of the dissolution of tissues between the ribs, one can often see into the thorax. The erosion of a vital blood vessel can lead to death through internal or external hemorrhages.

Recovery is frequent in other, rather severe cases. These cases are characterized by very intensive new tissue formation in the course of reparative recovery. The new tissue has a tendency to shrink massively and the scarred areas on the body surface of the animal remain very visible in the form of deep, hollow areas and disfigurement (picture 4). The meat value of such animals is greatly reduced.

The general condition of the afflicted animals is usually conspicuously good in comparison to the extent of the process. They have no fever when treatment is started and they are eating up to the very end of their life. There has not been a single case of repeated involvement once a diseased animal recovered.

**Occurrence and Spread of the Disease.** The disease appears during the warmer seasons and involves exclusively swine older than weaning age, 2-3 months. Following its introduction to a previously unaffected closed colony, there is a gradual increase in the number of animals requiring treatment and often about 30 to 40 percent of the animals may become ill by the third week. After the fourth week, there is a rather rapid decrease in the number of animals requiring treatment and practically no new cases appear by the end of the fifth week.

During the fourth and fifth weeks, rapid death is not rare among animals fighting with an unnoticed process. The disease will appear again in animals introduced to the colony later. Several questions concerning the introduction and spread of the disease remain as yet unanswered.

**Therapy.** Treatment of the diseased animals is possible by radical wound excision, removal of dead tissues, opening the wound to provide aerobic conditions, its lavage with tincture of iodine or a 3 percent hydrogen peroxide solution and repeated application of an antiseptic powder to the wound. In the case of neglected or far advanced disease, the parenteral administration of a broad spectrum antibiotic and infiltration of the tissues around the diseased area can also be effective. Treatment of the animals is very laborious and time consuming. In strongly infected surroundings, spreading of the process is greatly promoted by the slightest tissue injury (for example: the irritating effect of the noose used to fasten the animals by the nose) and a rapidly necrotizing, liquefaction process starts at such areas. Even the repeated, extra stringently performed disinfection of the entire colony could not slow down, it could even less control the spread of the disease in the cases presented.

Large industrial colonies where the disease became endemic could get rid of it only by replacement of the stock. Or the stock could be more-or-less saved from massive losses by inspecting the unaffected animals, and early and radical treatment of the afflicted ones.

**Etiology.** Precise data could not be obtained concerning the etiology of the disease. Performed with help from the department of pathology of the Veterinary Medical University, the histological and bacteriological studies as yet revealed only that pure cultures of Gram-positive staphylococci could be obtained from the base of the scabs of very early cases (involving scabby skin changes). From the area of later, invasive necroses, the histological study revealed the massive presence of silver-impregnated fusiform bacteria and especially spirochaeta-like microbes, especially in the fatty tissue, in addition to the staphylococci.

Further studies are needed to elucidate whether staphylococci are indeed responsible for the initiation of early changes in this disease. The observations pertaining to the disease reported (age of susceptible animals, seasonal character of the disease, its course, etc.) indicate that it has a completely different character from the one reported earlier in this journal by Simo (1961), Doman (1975) and Nador (1978).

#### Summary

A dermatosis afflicting many small and large-scale swine stocks is described. The disease begins with crust formation and manifests itself in deep necrosis. It only afflicts swine older than 2-3 months, mainly during the warmer seasons, and usually involves 30-40 percent of the stock. Treatment of the animals involves radical wound excision, irrigation of the wound either with tincture of iodine or with a 3 percent hydrogen peroxide solution, and occasionally the parenteral administration of broad spectrum antibiotics. From results of the bacteriological and histological studies it may be assumed that the early lesions are caused by staphylococci followed by fusiforme and spirochaeta-like microorganisms penetrating into the necrotic areas.

#### Comments on the Article by Dr Istvan Nothig

Appearing in Baranya Megye, primarily in Siklos county (alongside the Drava river), I wish to add the following experiences with necrobacillosis or green rot. As district veterinary, the disease first appeared in my district in Dravapalkonya. It was met with complete unintelligibility. Spreading of the disease was facilitated by the fact that it first appeared sporadically in animals raised on small household plots, followed by massive involvement but only of those animals which were grazed on pastures. Because the pastured animals usually rolled in the mud of the flood area of the Drava and returned home with the mud caked on them, the superficial skin necrosis remained unnoticed until a heavily rimmed, oozing ulcer appeared.

With generalization of the disease, the situation was helped by regular palpation of the returning swine on the part of the population to find any existing superficial injuries. Namely, it was found that early, radical treatment had a very good prognosis and the swine could even recover without trace.

Until 1975, while working as a practicing veterinary, I could distinguish between two significantly different forms of the disease.

#### 1. The So-Called Dry Rot

During the years when the disease had first appeared, this was its only known form. An external ulcer appeared on the skin with the above mentioned thick rim. The ulcer corresponded to an inverted funnel while a wedge-shaped necrosis could be found reaching deep down into the tissues. The necrotic tissue was foul smelling but, instead of liquid, it was a dry necrosis with greenish discoloration resembling coagulation necrosis. This dry necrosis

appeared primarily on the massive muscles, in the withers area, thigh muscles and less frequently elsewhere. The dry necrosis was characterized by a very favorable prognosis. Traditionally, smaller piglets weighing 25 to 30 kg also went to the pastures and in some cases half of the thigh muscles had to be removed in the course of treatment.

In the course of treating many hundreds of pigs it could be observed that surgical opening and removal of the necrotic tissue had to be complete. In 1 or 2 cases when treatment of strong sows was made difficult by lack of assistants and the necrotic tissue could not be removed completely, the process progressed and the same animals had to undergo repeated treatment. Occasionally, the afflicted right side of an animal recovered after treatment and 2 months later new necrosis appeared in the withers area thereby necessitating 2 or 3 courses of treatment for the same animal for necrosis developing at different sites each time (in contrast to Dr Nothig's observations). The most effective therapy was surgical opening supplemented by lavage with hydrogen peroxide and followed by packing the wound with Molinol wound oil, and sprinkling with a surgical dusting powder. Additional treatment could be furnished by the helpers and the prognosis was very good. Even extensive areas healed rapidly, within 7-10 days. The larger areas remained visible later in the form of scarring and contractions. After introducing routine inspection and palpation of the swine by the keepers, they were treated at the earliest appearance of the infection before the necrosis could progress into deeper tissues. These animals recovered without trace. Another observation made is that the necrosis does not spread to the serous membranes or periosteum. Occasionally surgical intervention was so radical that one reached as far as the outer layer of the peritoneal or pleural wall. However, the necrosis stopped there and the prognosis remained reasonably good. Furthermore, I have observed that after surgical opening of the wound (perhaps because of the deodorant effect of Molinol or for some other reason) the flies did not lay their eggs in the greatly exposed wounds as is the experience with other types of wounding.

The fact that, occasionally, one animal received repeated treatments at different time intervals and involving different sites indicates that no specific resistance develops in the organism.

## 2. The So-Called Wet Rot

After a few years existence of the above described infliction, a new form of disease appeared in one-tenth of the cases, the so-called wet rot. The affliction started to develop in the form described by Dr Nothig in his article. However, in these cases the depths did not contain dry coagulation tissue and the necrosis did not appear in a wedge shape extending like an upside down funnel. In these cases enormous bags, abscess-like formations appeared in the depths. The muscle spindles also necrotized and an odorous smeary exudate was found in the depths. Necrosis was very extensive, usually the width of several palms. The symptoms resembled those described in association with gaseous edema cases.



In these cases treatment was judged medically hopeless and, in treating the initial cases, the conviction was formed that treatment is not worthwhile. At the same time, these animals also could not be recommended for emergency slaughter since they would have been rejected because of the disgusting changes. Nevertheless it must be mentioned that in rare cases some of these animals recovered. On inquiry the reply was given that they were treated with home remedies (caustic lime, petroleum). However, these animals usually lost weight, their body rotted away completely and the skin--which remained like a shroud--covered necrotic parts. Occasionally the shoulder bone or some other bone stuck out from under the skin and they died after long suffering.

Currently the disease appears in the Megye according to the description by Dr Nothig in his article.

As mentioned before, the disease first appeared in the southern part of Siklos county, in the Harkany district. It has spread westward in the direction of Dravafok but it is also occurring in Szigetvar county and in some areas of Pecs county. While earlier it appeared only in animals from small household plots, it also has occurred massively in large industrial herds for several years. Specialists at institutions were repeatedly consulted about the problem. Recommendations almost invariably included the parenteral administration of large doses of broad spectrum antibiotics. In my judgement this would be useless. Namely, the animals are in good general health at the onset of the disease and the antibiotic will not reach the necrotic tissues. At the same time, I cannot build a lasting barrier to prevent necrosis. The above mentioned considerations are presented to supplement the description by Dr Nothig. [signed] Dr Laszlo Benyi, deputy director, Pecs

The experiences of colleagues Dr Nothig and Dr Benyi with the problem under discussion are so noteworthy that their reading made me pause to think. I have already encountered similar changes but I have never before heard of such massive occurrences. My comments will not be aimed at settling the problem since this would be impossible. Yet I should like to start the train of thought in a certain direction. I am doing it with the knowledge that irrespective whether my deductions are correct or not, they can be used in the course of further observations and investigations.

On the basis of the descriptions by doctors Nothig and Benyi, which are built on good observations and appear exact, I formed a hypothesis that we are faced not with a "distinct disease" but rather with a surgical disease which hitherto had not been paid sufficient attention to or had not occurred in such massive numbers. The latter could be confirmed and could be explained by the fact that no concrete mention of it is made in our domestic literature. However, certain references can be found to disturbed healing of wounds, wound infections, necroses, etc. in the general surgical pathological processes. Based on the descriptions and on similar cases observed by me sporadically, my theory is that due to some--presumably non-specific--cause, tissue injuries, bruises occur on the skin (on pastures it could be caused by dogs, swine or some mechanical factors). The injury is a port of entry and the necrotic tissue is a good culture medium for the bacteria which happen to be present and which, in addition to staphylococci, can also be other microorganisms



causing necrosis and tissue decomposition. The relatively anaerobic situation probably favors the spread of some of them. This causes the spreading of the process toward deep tissues and the therapeutic results achieved also point toward this.

Thus the process presumably starts as a consequence of external injuries. Subsequently, the degree and measure of the infection and the pathogenic characteristics of the infecting bacteria determine the spread and character of the process. Therefore, understandably, the best results can be expected from the earliest and most radical surgical treatment possible. The complete removal of diseased tissues was successful because most of the pathogens were removed with them. In certain stocks the disease can appear massively because of numerous tissue injuries and it may become a disease involving the entire stock because of multiplication of the infectious germs.

If my hypothesis is correct, then improved general hygienic conditions must also be considered in addition to the surgical therapy. The first phase of defense is the protection against injuries. Disinfection alone, without the removal of animals which are bacterium carriers and which excrete massive amounts of bacteria from their wounds, cannot lead to success. [signed] Dr Istvan Szabo, deputy director, Budapest.

2473

CSO: 2502

## SYNTHESIS OF INSECTICIDE DIPHENYLISOXAZOLE DERIVATIVES

Budapest MAGYAR KEMIAI FOLYOIRAT in Hungarian Vol 85 No 9 Sep 79 pp 385-387  
manuscript received 20 Nov 78

SZABO, Vince, NEMETH, Laszlo, and BORDA, Jeno [Department of Applied Chemistry, Kossuth Lajos University of Sciences, Debrecen]; BOKOR, Gyorgy [North-Hungarian Chemical Works, Sajobabony]

[Abstract] The synthesis and insecticidal performance of a number of 4, 5-diphenylisoxazole-0-(alkylcarbamoyl) and -0-(diethylthiophosphoryl) derivatives is described. The synthesis starts from isoflavones, which in turn are prepared from 2-hydroxydesoxybenzoine by Claisen condensation (2-substituted derivatives of the isoflavones are prepared by means of Kostanecki-Robinson acetylation). 4,5-diphenylisoxazole derivatives are obtained in high yield by boiling the isoflavones in a water-alcohol medium at pH 8 with hydroxylamine. Three 0-(alkylcarbamoyl) derivatives are synthesized from the products (both the yield and the reaction rate depend on the substituent). While they exhibit a degree of insecticidal effectiveness, this can be substantially increased by converting them into 0-(diethylthiophosphoryl) derivatives. Then, their effectiveness (measured with *Acanthoscelides obtectus*) comes close to that of commercial phosphorus containing insecticides. The effectiveness-increasing performance of the trifluoromethyl group in the carbamates was especially pronounced. Figure 1; tables 4; references 12: 1 German, 6 Hungarian, and 5 Western.

2542

CSO: 2502

UDC: 681.3.06

## SMALL COMPUTER BUILT WITH THE INTEL 3000 BIT-SLICED MICROPROCESSOR SYSTEM

Budapest MERES ES AUTOMATIKA in Hungarian Vol 27 No 5, 1979 pp 174-179

Manuscript received 15 Feb 79

AMBROZY, GYORGY; MISKLOCZI, JANOS, and VAJDA, FERENC, Metrology and Computer Technology Research Institute, KFKI [Central Physics Research Institute], MTA [Hungarian Academy of Sciences]

[Abstract] A microprogramming microprocessor system capable of emulating the central processor units of small computers, such as the TPA 1140, was described. It uses the central processor units Intel 3001 MCU and 3002 CPE [central processor element]. The central unit of the emulator consists of eight CPE, one microprogram control unit (MCU), and a look-ahead carry generator. It also includes a register block of 16 16-bit registers each, a command register, a decoder, a condition register which facilitates the branchings of the microprogram, and a PROM control-memory block containing  $2 \times 512$  words, each up to 64 bits. The CPE, the register block, the command register, and the condition register are coupled to a microprogram-controlled internal data bus. The register block supplies the general registers of the emulated small computer; the internal registers of the CPE are the working registers. The address outputs of the MCU and the microprogram memory outputs are supplemented with control signals, and form a microprogram bus to which a control memory (RAM, EPROM, PROM) with any access time may be connected. The system may be expended by addition of more hardware. The command complement comprises arithmetic, program-control, and other (condition-bit erasing, HALT, RESET, WAIT, etc.) commands. Evaluation of the system in general, and the Intel components used in particular was on the basis of microcycle time, construction, and microcommand complement. The 3001 MCU was adequate for microprogramming the basic emulator, but address selection was limited. Many extra commands were necessary because of the inadequate number of flags available, and the lack of hardware loop organization and subroutine callup was acutely felt. On the other hand, the multipath branching possibility was effective in direct access to the functions to be decoded. The 3002 CPU had the advantage of having many buses; however, it was still necessary to use an external register block. The separately accessible macroaddress and data register were useful, as was the elastic

masking system. Since the available condition bits were few, the missing ones had to be programmed by a long microprogram sequence. The dimensions of the overall system were much smaller than those of the TPA 1140, and only two printed circuit boards were needed instead of nine. The speed advantage was not pronounced. The system may be expanded by a control memory of up to 4K words; thus, user commands may be included in the basic command complement, and microprogrammed user program modules or high-level translation programs may be written in microcode. Figures 4; references: 17 Western.

2542

CSO: 2502

UDC 519.68:621.372.54.011.732.22

## PROGRAM SYSTEM FOR DESIGN OF LC FILTERS

Budapest: HIRADASTECHNIKA in Hungarian Vol 30 No 8, Aug 78 pp 225-237

HERENDI, MIKLOS, dr., Research Institute for the Instrument Industry

[Abstract] A flexible minicomputer program was developed to solve filter design parameters. The DPLC program system was operated on the 64 kbyte memory computer of the Research Institute for the Instrument Industry. The program used 6-byte long double-precision type variables in the FORTRAN language. Details of the DPLC program system are described; development of the program system required 3 man years. The capabilities of the system are illustrated by design tasks run with its help. Figures 13; references 21: 10 Eastern European; 11 Western.

2210

CSO: 2502



## SIMULATION OF THE SILICON PLANAR TECHNOLOGY WITH COMPUTER

Budapest FINOMMECHANIKA ELEKTROTECHNIKA in Hungarian Vol 18 No 9, Sep 79  
pp 257-260

TARNAY, Kalman, Dr, lecturer, Acting department head, Candidate in engineering sciences; MASSZI, Ferenc, Dr, Assistant professor; MIZSEI, Janos, assistant professor; BAJI, PAL, assistant professor; KOVACS, Balazs, holder of scientific scholarship, Department of Electronic Devices, BME [Budapest Technical University]; RANG, Toomas, graduate student, Tallinn Technical University, USSR; and DROZDY, Gyoza, engineering-faculty student, Central Physics Research Laboratory.

[Abstract] The simulation of the silicon planar technology by computer in general, and the simulation of the diffusion of the additives in particular, is discussed. The processes are handled on the basis of the Fick Law, which describes the relationship between the flux of the diffusing substance and the concentration gradient. Electrical effects, the relationships between semiconductor and diffusing substance, and thermodynamical factors are also taken into consideration. A continuity equation is derived for the characterization of the diffusion process, and a numerical solution of the equation is developed. The computations are illustrated by an example concerning the changes in the diffusion constant of phosphor additive at various temperatures. Basically, the computer performs an iterative process to minimize the difference between the matrix parameters and the diffusion parameters. Figure 3; tables 1, references: 6 Western.

2542

CSO: 2502

## COMPUTER ASSISTED RELIABILITY TEST OF BREAKSAFE THYRISTORIZED POWER SYSTEM

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 18 No 7, Jul 79  
pp 202-206

KARPATI, Attila, Dr, Associate professor; IPSITS, Imre, lecturer; and HERMANN, Imre, Assistant professor, Department of Automation, Budapest Technical University; and SZENTAI, Endre, Dr, Staff scientist, Research Institute for Computer Technology and Automation, MTA [Hungarian Academy of Sciences]

[Abstract] The reliability testing of an existing heat-storage type emergency power supply system is described. The system consists of two inverters with equal output, each being capable alone to provide the required supply. The inverters are connected in parallel on the a.c. voltage side. The tests indicate whether any of the following states exists: (1) system in good operating condition; (2) the selectively decoupling circuit of one inverter is faulty; (3) the selectively decoupling circuit of both inverters is faulty; (4) one inverter is faulty and unable to provide supply, however without automatic disconnection or error message; (5) fault in a subassembly which caused selective decoupling of the defective inverter; and (6) failure of the entire system. System reliability is expressed by the mean time between failures (MTBF) values; the study is carried out by means of statistical and probability techniques. Assuming repair times of a few days, the MTBF value of the system did not change significantly, indicating that the system operates close to the maximum attainable MTBF level. The actual MTBF value is practically limited by the total failure ratio of components causing failure of the entire system (such as control oscillators and those parts of the control circuits which cause an output voltage drop when defective). It is thus indicated that improvements may be done in these components. It was also concluded that the inverters should be equipped with protectors also sensing hidden defects (and decoupling the system). The assumption that failure of one inverter as a result of internal short circuit would cause selective response of the protectors of the inverters concerned requires further confirmation. The results also showed that the MTBF value of the system is essentially unaffected by the loading. An appendix (pp 205-206) describes the algorithm used, which is also suitable for computerized evaluation. Figures 5; references 2: both Hungarian.

## METHODS OF TESTING WIRE BONDS IN HYBRID MICROCIRCUITS

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 18 No 7, Jul 79  
pp 222-224

BIELAWSKI, Waldemar, and FORTUNA, Elzbieta, Electronics Industry Institute;  
and JABLONSKI, Jacek, Unitra-Elektron Union, both in Poland

[Abstract] Methods developed for the testing of wire bonds in hybrid microcircuits between aluminum contacts and the gold circuit paths by means of ultrasonic bonding, using 25 or 40  $\mu\text{m}$  thick 99% gold/1% silicon wire, are described. The following tests are carried out: (1) visual examination (of the appearance, form, and contact); (2) tensile testing of the joints for the determination of elongation at break, breaking force, and location of the break; and (3) electrical tests (not quite suitable for assessing the quality of the bond but very useful for evaluating the environmental effects on the bond). An evaluation of the lifetimes and test results of the bonds indicated that (1) the joints may only be made on contacts bonded with gold paste (such as Du Pont 9260) operated at below 70°C under loads not exceeding 40 mA or 100 mA with 25  $\mu\text{m}$  and 40  $\mu\text{m}$  wire, respectively; (2) the loadability of the printed circuit conductor strips also affects the maximum permissible current; and (3) moisture, temperature fluctuations, high temperature storage, and the like have a major effect on circuit performance. Figures 4; references 3: all Western.

2542

CSO: 2502

UDC: 621.375.826:621.3.049.77:621.9.048

## LASER TECHNOLOGY IN THE ELECTRONICS INDUSTRY

Budapest HIRADASTECHNIKA in Hungarian Vol 30 No 9, Sep 79 pp 264-268  
manuscript received 12 Jul 79

SHELMAKH, M. F.; TIMOFEYEVA, A. I.; and CHELNIY, A. A., Ministry of the Electronics Industry of the USSR

[Abstract] The following areas of laser technology advanced most intensively in recent years: spot- and seam-welding in the fields of electrovacuum and solid-state devices, as well as integrated circuits; fabrication of thin layers, tuning of resistors of integrated circuits and the frequency of quartz resonators, cutting the spirals of discrete-type metal-layers, and creation of masks and templates for circuits; cutting and scribing solid-state and dielectric substrates for integrated circuits; cutting and welding of glass in the manufacture of electrovacuum instruments; heat treatment of pressing tools and chip-forming fabricating tools to increase strength and lifetime; and production of thin layers, especially insofar as vacuum-evaporation deposition methods are concerned. Laser welding, using primarily solid-state pulse lasers with an energy of 1-30 Joule and pulse durations of 1-7 msec, is an especially important application; speeds of 60 operations/min and 100-200 mm/min, respectively, may be achieved in spot and seam welding at a melting depth of 0.1-0.7 mm. Studies are underway in the area of increasing the material pairs weldable with laser, increasing the melting depth, modernizing the joining technology between devices and contacts, and combining welding with other technological processes. In the field of fabrication of thin layers, tuning of the integrated resistor network of hybrid integrated circuits is the most widely used procedure. An increase in the mean power of garnet lasers now permits the use of substrates for integrated circuits made from Sital, ceramics, silicon, and the like to be cut. The parameters of laser-based apparatus available for thin-layer fabrication and scribing from Soviet manufacture are presented in tabular form. Glass may be cut and welded with carbon dioxide continuous lasers with an output of 100 W. Drilling may be accomplished with pulses of 1-50 Joule 1 msec pulses. Heat treatment with laser has a number of advantages: localized treatment of the thin surface layer causes a jumpwise increase in the internal stress of the device, thus reducing warping and eliminating the need for grinding. Also, a high degree of hardness may be achieved. In general, the use of lasers in appropriate fields increases productivity and improves product quality. Tables 3.

UDC: 681.3.01:621.3:048

## INSULATED SIGNAL PROCESSING

Budapest MERES ES AUTOMATIKA in Hungarian Vol 27 No 9, 1979 pp 325-328  
manuscript received 13 Apr 79

MAKRAY, ISTVAN, development institute of VBKM [Electrical Equipment and Appliance Factory], and ROZSA, LAJOS, dr, Research Institute for Computer Technology and Automation at the MTA [Hungarian Academy of Sciences]

[Abstract] There are various ways to ensure that interfering signals are kept away from the signal to be measured and processed. This article describes the principle, design, construction, performance, and applications of the HEK-10 device, developed at VBKM. This device is a ten-channel instrument signaling if a preset limit value is exceeded so that appropriate (automatic or manual) intervention can be initiated. The minimum and maximum signal parameter to be monitored may be set for each channel. The advantages of the HEK-10 include the following: Metrological applications are possible without telemetering transmitters for up to 500 m (shielded cable) or 100 m (non-shielded cable); highly reliable measuring systems may be realized without firing spark; the measurement system may be retrofitted to an existing measuring and control system; reduced investment and maintenance expenses (resin capsulation); and modular design to permit special applications to be realized. Examples discussed include the monitoring of the temperature of oil pipeline pumps, monitoring the tension of coal-mine conveyor belts, and regulating the pH in a pharmaceutical factory. The device proved to be highly reliable in actual use. Figures 4; tables 1.

2542

CSO: 2502



## A NEW GENERATOR OF UHF FM BROADCAST TRANSMITTERS

Budapest BHG ORION TERTA MUSZAKI KOZLEMNYEK in Hungarian Vol 24 No 6,  
1978 pp 241-245

FALUS, LASZLO, dr, graduate electrical engineer, head of the Development Department, and HERCZ, ENDRE, graduate electrical engineer, head of the Transmitter Section of the Development Department, BHG [Beloianisz Communications-Engineering Plant]

[Abstract] The third-generation 2.5 and 10 kW UHF FM transmitters for broadcasting stations, developed at BHG since 1970, are described and illustrated with block diagrams and photographs. The transmitters are designed to handle the coded (multiplex) signals of the quadrasonic programs soon to be transmitted. This means that the modulation frequency range is extended to 91 kHz. Solid-state components are used throughout. The transmitters are installed in a single cabinet with good accessibility for service and space for added components or displays. Automatic passive redundancy is built in. The basic unit, the frequency modulator, may be used as a 50 W transmitter in its own right. Monophonic and stereophonic versions are now being built. There is a quadruplexer for the joint operation of four 10 kW transmitters, a control console for remote operation, and various antenna systems. Load impedance is 50 ohms, the frequency range is 66-73 MHz (OIRT type) or 87.5-108 MHz (CCIR type). Mean frequency stability is up to  $\pm 0.5$  dB; stereo crosstalk attenuation is better than 38 dB; harmonic distortion is up to 0.5 percent at full modulation; intermodulation distortion is up to 0.75 percent. The transmitters compare favorably with other products made abroad. Figures 6; references: 1 Hungarian.

2542

CSO: 2502

## THE FTK-120, THE NEW A.C. TELEGRAPH UNIT FROM THE TELEPHONE PLANT

Budapest BHG ORION TERTA MUSZAKI KOZLEMENYEK in Hungarian Vol 24 No 6,  
1978 pp 255-260

VERESS, PETER, graduate electrical engineer, department head, TERTA  
[Telephone Plant]

[Abstract] The FTK-120 telegraph unit, the large-scale homogeneous station of the Telephone Plant's BT-50/200 system, is described and illustrated with block diagrams and photographs. In full configuration it accommodates the transmitting and receiving circuits of 120 audio-frequency telegraphs, channels, as well as the necessary auxiliary units (such as maintenance instruments, service telephone, telegraphic power supply, and backup units). The internal power supply of the frequency-modulated telegraph unit is -21 V. The module accommodating 24 telegraph channels contains up to four transmitting and four receiving line amplifiers. Four audio-frequency base circuits may be connected to the module to serve all six telegraphic channels. Two levels of alarm signal are available, for non-urgent and urgent faults, respectively. A separate module provides the various voltages required (+30 V telegraph voltage, +5 V for displays, and -21 V internal supply voltage). A module provides the service and measurement functions, such as the service telephone, maintenance instruments, and trunk circuits. A level meter is installed to measure the signal voltages appearing on the audio-frequency counter, recorder, and earphones. A telegraph-signal tester may be connected to special outputs provided for this purpose. The technical specifications are listed. Figures 9; tables 1.

2542

CSO: 2502

## TRANSPORTATION AND STORAGE OPERATIONS FOR THE ASSEMBLY FACILITY IN THE TROPICAL CLIMATE OF CUBA

Budapest BHG ORION TERTA MUSZAKI KOZLEMENYEK in Hungarian Vol 24 No 6, 1978 pp 261-266

MOLNAR, LASZLO, graduate electrical engineer, research engineer at the Product Testing Department of BHG [Beloianisz Communications-Engineering Plant]

[Abstract] A telephone-exchange assembly facility is being set up in Cuba. This article discusses the transportation and storage problems involved in the project. Tropical conditions, high air temperature, high relative and absolute air humidity, penetration of rain and sea water, salty mist from the sea, mold, and termites must be considered. The subexchanges are designed for tropical climate. Protective measures and guidelines were developed for shipments between Hungary and Cuba, as well as for shipments within Cuba. Standards were set up for shipping equipment from third countries to Cuba. Non-metallic materials must be protected from moisture (special materials with high moisture resistance were developed), mold, and termites (which must be watched carefully during storage). Metallic materials are particularly affected by salt mist, necessitating special protection during storage. Special measures are needed to ensure the continued solderability of cable ends (protective coatings). Some assemblers perspire heavily and contaminate parts with corrosive fingerprints. They must be tested before employment. Special specifications were developed for electrical contacts and warehouses. The performance of the products to be manufactured depends on the success of the measures described. Figures 3; tables 1; references 7: 5 Hungarian; 2 Western.

2542

CSO: 2502

EXPERIENCES GAINED DURING THE INSTALLATION OF THE TYPE BO-12-E2 TWELVE-CHANNEL CARRIER-FREQUENCY TRANSMISSION SYSTEM IN LYBIA

Budapest BHG ORION TERTA MUSZAKI KOZLEMENYEK in Hungarian Vol 24 No 6, 1978 pp 267-268

FUZY, VILMOS, graduate electrical engineer, development engineer at TERTA [Telephone Plant]

[Abstract] The transmission network to supply electric power in Lybia is under construction. At the present time, a 960-channel microwave system is in operation, supplied by Nippon Electric Company. Connection to the international communication networks is via undersea cables and troposcatters. The Nippon Electric Company performed outstanding work. A test length of TERTA's Type BO-12 overhead carrier-frequency transmission system in E2 construction has been installed. The feed cable has a capacitance of 50 nF/km, and has 0.6 mm diameter strands. Oscillation damping was satisfactory. As much prefabrication was practiced as possible to make on-site installation easier. 2/4-wire audiofrequency terminals (CB terminals) are used; they are made by FAFME. The test length operates as a side branch of the 960-channel microwave system, to which it is connected by a suitable interface. Of the 12 channels at the terminal, four are CB-terminated. During installation, comparisons were made with competing products. The TERTA system was found competitive in performance. Additional sections have been ordered by the Lybian partner. They represent 12-channel overhead transmission lines, some with battery supply and CB termination. The Type BO-12 so far met the challenges, but large-scale manufacture is still to come, which may pose new challenges. Figure 1; no references.

2542

CSO: 2502

## EFFECT OF THE REQUIREMENTS FOR MECHANIZATION ON THE DEVELOPMENT OF NUMERICAL-CONTROL TECHNOLOGY

Budapest GEP in Hungarian Vol 31 No 9, Sep 79 pp 333-337

LEHOTZKY, JOZSEF, United Incandescent Lamp and Electrical Enterprise, Budapest

[Abstract] Studies are underway to install the joint use of all preparative NC [numerical control] services and AC [adaptive control] features in the fabricating machine, with the aim of establishing the effectiveness of such integrated service and thus the range of suitable applications. Some of these studies are discussed on the basis of examples. The range of these applications widened by the introduction of microcomputers (for example CMC [computer numerical control] systems based on FANUC Mate and Sprint, as well as Siemens Type 5 or 7 units). ACO [adaptive control, optimization] combined with NC may now be used in such special cases as circle grinding and spark fabrication (for example with a system featuring a 6-10 kbyte internal memory and suitable program languages). The control system of General Automation features a built-in microprocessor to control path generation for the grinding tool three-dimensionally. ACO and NC have their own handling programs, which are combined in contemporary systems for extended application range. The uses of the new systems require a higher degree of operator training and proficiency. The potentialities are not yet fully realized, but there is an indication of a second engineering revolution once they are. Figures 2; tables 1; references: 1 Hungarian.

2542

CSO: 2502



## PEACETIME, CIVIL DEFENSE ASPECTS OF RADIATION SAFETY PROGRAMS

Warsaw PRZEGLAD OBRONY CYWILNEJ in Polish No 9, Sep 79 pp 15, 41-42

[Article by magister Dariusz Grabowski, docent Tadeusz Rzymkowski and eng Janusz Skotniczny]

[Excerpts] Relying on the results of worldwide research projects, the International Atomic Energy Agency issues detailed recommendations concerning the standards that are to govern the use of radioactive isotopes and exposure tolerance norms with regard both to the general public and to professional persons whose jobs involve the handling of radioactive substances. These recommendations then serve to lay the groundwork for the drafting of national laws in the area of radiological protection. Compliance with these laws virtually guarantees total compliance with radioactive safety standards.

In Poland research work in the area of nuclear power got under way at an early date, on a large scale and on a high scientific level. As has been the case in most other countries, the process of finding practical applications for nuclear technology has been developing in a regular fashion. Intensive work along these lines got under way during the mid 1950's in conjunction with the founding of the Nuclear Research Institute, and the installation of major nuclear research facilities such as the "Ewa" reactor in Swierk and the cyclotron in Krakow. The Office of the Government's Plenipotentiary for the Harnessing of Nuclear Power was established and specialized institutions were created within the jurisdiction of this Plenipotentiary. Scientific research centers sprang up in the universities that are also working on ways to find practical applications for nuclear technology in various scientific disciplines and branches of the economy. A research and testing infrastructure was built up and work got under way on the mass production of measurement and monitoring devices. Work was also started on the drafting of plans for the development of a nuclear power industry, on the theory of nuclear reactor design and on the design and construction of reactors, including power-generating reactors.

A high priority was assigned to questions of radiological protection. In order to insure the safe harnessing of ionizing radiation for economic purposes Poland developed a system of radiological protection or radioactive safety. This system is based on organizational units which are subordinate to the Ministry of Power and Atomic Energy, the Ministry of Health and Social Welfare, the Central Council of Trade Unions and the various sectoral Trade Unions.

Resolution no 170/61 of the Council of Ministers dated 9 May 1961 dealing with protection against ionizing radiation and the Decree of the Council of Ministers dated 18 June 1968 dealing with occupational health and safety in the practical application of ionizing radiation placed issues pertaining to the medical and public health aspects of protection against ionizing radiation under the jurisdiction of the Ministry of Health and Social Welfare, while issues of a technical nature were placed under the jurisdiction of the Government Plenipotentiary for the Harnessing of Nuclear Power (which has now been superseded by the Ministry of Power and Atomic Energy). These two ministries took steps to organize the supervision of the activities of plants engaged in the practical utilization of ionizing radiation. At the present time this supervisory authority is being exercised within the jurisdiction of the Ministry of Health and Social Welfare by the voivodship offices for public health and epidemiology, while within the jurisdiction of the Ministry of Power and Atomic Energy this authority is being exercised by the Central Laboratory for Radiological Protection.

Of course, this does not mean that Poland had no organized radiological protection programs prior to the enactment of these laws and the dates of their promulgation. The Central Laboratory for Radiological Protection, which is responsible for dealing with all problems associated with radiological protection was founded as far back as 1957.

The Central Laboratory for Radiological Protection [CLOR] is carrying on scientific and engineering R & D work which covers, inter alia, such fields as:

- research on the radiological protection of the general public and the environment;
- Monitoring the distribution, utilization and transport of radioactive sources;
- advisory consultations concerning designs for isotope laboratories, nuclear technology installations, isotope apparatuses and dosimetric safety apparatuses with respect to the satisfaction of radioactive safety requirements;
- monitoring the exposure of workers engaged in the handling of radioactive substances;
- monitoring radioactive contamination on Polish territory;
- monitoring the status and movement of nuclear materials in keeping with the provisions of the Nuclear Nonproliferation Treaty;
- training special radiological protection inspectors who supervise work with radiation sources.

The rules governing the use of radioactive substances, their acquisition, and the management of radiation sources were spelled out in Order no 23 of the Government Plenipotentiary for the Harnessing of Nuclear Power dated 21 July 1970. Pursuant to existing Polish law the opening of all isotope laboratories and the startup of work with radioactive isotopes may proceed as soon as a license has been obtained from the Public Health Inspectorate. Such licenses are issued after an advisory report has been obtained from CLOR with regard to the satisfaction of radiation safety requirements by

a given isotope laboratory. Acting in agreement with the Public Health and Epidemiology Department of the Ministry of Health and Social Welfare, CLOR submits advisory reports on all phases of the design drafting process, both with regard to newly built and modified isotope laboratories and also with regard to large-scale nuclear engineering facilities. In addition to submitting advisory reports on isotope laboratories similar reports are filed prior to the utilization of nuclear engineering equipment of foreign manufacture and certificates are issued permitting the utilization of certain kinds of domestically manufactured equipment such as dosimetric devices, safety equipment and isotope monitoring and measurement apparatuses.

A laboratory must meet conditions which insure the safety of workers and the environment and provide for the proper storage of radioactive isotopes. The system that is set up for the removal or securing of radioactive wastes must be equipped with devices and apparatuses capable of monitoring potential threats.

Another condition that must be met before work with radioactive isotopes can begin is the drafting of a set of rules and regulations to govern work with radiation sources in a given laboratory and technical instructions for carrying out specific kinds of jobs. Finally, laboratories must make arrangements for the continuous supervision of radiation safety and protection conditions. This supervisory authority is to be exercised by a trained radiological protection inspector. After these requirements have been met an establishment with a working isotope laboratory may obtain a license from CLOR giving it the right to procure radiation sources. The manufacture and distribution of isotopes is the responsibility of the Center for the Production and Distribution of Isotopes (OPiDI) of the Nuclear Research Institute in Swierk, the only institution in Poland authorized to discharge this responsibility. Orders for radioactive isotopes submitted to OPiDI by such establishments cannot be filled without confirmation from CLOR to the effect that a given establishment has fulfilled the appropriate preconditions and is in possession of license for the procurement of radiation sources of a specified level of radioactivity.

In order to insure maximum safety and in order to make sure that isotopes are used in a manner which does not pose a threat to the health of laboratory workers or the environment arrangements have been made to supervise and monitor work with radioactive isotopes.

Radiation safety inspections are carried out on a systematic basis in all establishments working with radioactive substances by teams of inspectors from the CLOR. These inspections consist in the verification as to whether or not a user is employing radioactive substances in accordance with the designated purpose for which a license was issued for the procurement of such substances, the verification of compliance with proper rules and regulations pertaining to the transport, storage and in-checking of radiation sources, the verification of compliance with designated procedures for the neutralization and storage of radioactive wastes and for decontamination, making checks to determine the availability of dosimetric apparatuses and protective equipment and the monitoring of their effectiveness, taking dosimetric readings with a view to eliminating causes of overexposure and radioactive contamination of work areas, personnel and so on.

The data collected during such an inspection together with the results of measurement readings form the basis for the compilation of an official inspection record which is subsequently submitted to the plant that was inspected and to the Public Health Inspectorate and Labor Relations Inspectorate with local jurisdiction. This official record comprises a thorough analysis of the status of radiation protection measures. As an integral part of such official records specific recommendations are made to the management staff of establishments aimed at enhancing the quality of these radiation protection measures. In the event that flagrant shortcomings are revealed as a result of these inspections, the CLOR suspends all work with radioactive isotopes until such time as these shortcomings are eliminated. In conjunction with its monitoring and advisory functions the CLOR is also obliged to maintain a central registry of establishments using radioactive substances and to keep records on compliance with radiation safety standards among users of isotopes and equipment containing radiation sources. At the present time 2,170 establishments are listed in the registry of establishments using radioactive substances.

The utilization of radiation sources in laboratories and production plants in effect poses no threat to the environment and the levels of radioactivity to which personnel are exposed fall well within tolerable limits provided that steps are taken to comply with all required working rules and regulations. All workers whose jobs involve the use of X-ray apparatuses, radioactive substances and nuclear engineering equipment are subject to regular individual exposure detection examinations. Individuals exposed to the effects of X-ray radiation are examined by the Institute of Industrial Medicine in Lodz, while other workers are examined for individual dosage-level exposures by the CLOR.

During the course of a given year more than 95 percent of the people in Poland subject to these mandatory examinations receive less than 0.1 percent of the maximum allowable radiation dosages prescribed by international regulations. During the course of a given year these examinations reveal 20 to 30 cases of individual exposures which exceed the maximal allowable quarterly limits. However, these cases exceed the quarterly exposure tolerance values by a small margin. There are only sporadic instances in which individual exposure levels have exceeded the maximum tolerable dosage levels.

All persons exposed to radiation also undergo regular medical examinations which are above all aimed at detecting illnesses that would necessitate their exclusion from jobs involving the handling of radioactive substances.

In spite of the existing and ever more effective system of monitoring and supervision measures, in spite of the wide range of preventive measures undertaken in the area of radiation protection and notwithstanding the increasingly more refined equipment and apparatuses used for this purpose accidents do occur, fortunately at infrequent intervals, during the course of work with radiation sources that could pose the threat of ionizing radiation levels seriously exceeding the levels that prevail during normal working



conditions. These accidents are caused by damage to the equipment that is being used, undetected defects in the design of this equipment and the failure to comply with technical instructions governing the operation of this equipment as well as by the lack of supervision, the disregard of regulations and even carelessness, and the theft or loss of radiation sources.

A special Damage Control Service was established in order to provide professional assistance and supervision in connection with the cleanup of accidents and their consequences and in order to take preventive measures aimed at forestalling such accidents. The Damage Control Service is made up of the Control Center and the central emergency assistance group established within CLOR for the country as a whole regional groups affiliated with the Nuclear Research Institute in Swierk and the Nuclear Physics Institute in Krokow.

The Control Center of the Damage Control Service is responsible for carrying out preventive and emergency assistance measures and for analyzing the causes of radiation accidents throughout the country. This Center accepts telephone reports on accidents that have occurred throughout the day (telephone number: 11-15-15). After having evaluated the threat posed by a given reported accident the Center either issues directives and necessary instructions aimed at eliminating the causes of the accident within the scope of its own initiative and jurisdiction or, if necessary, dispatches a CLOR emergency assistance team to the accident site. Every radiation accident is analyzed in detail from the standpoint of the threat that is created, the causes of this threat, the nature of the working environment in which this threat arose, and so on. Among other things, this kind of analysis is supposed to prevent similar accidents from recurring in the future.

In recent years we have witnessed a relative decline in the number of radiation accidents. While in 1964 there were 30 reported radiation accidents for a total of 580 registered establishments working with radioactive substances, in 1974 the Control Center received 41 reports of radiation accidents for a total of 1,636 establishments working with radioactive substances. And in 1978, when there were 2,170 establishments registered as working with radioactive isotopes, 41 radiation accidents were reported. This record is undoubtedly the result of the monitoring, instruction and training programs carried out by the CLOR.

A knowledge of radiation safety rules and the regulations that apply in this area is a necessary prerequisite to insuring safety in work with radioactive isotopes. All work with radiation sources should be supervised by an individual who has been appointed by the plant manager and who has received the necessary professional training. These individuals may obtain this training by attending radiation safety inspector courses, and the skill ratings they acquire in this way may vary depending on the nature of the potential threat that exists in a given establishment. Inspectors with a third class rating who are authorized to supervise operations in isotope laboratories with exposed radiation sources, in defectoscope laboratories and so on are trained exclusively by the CLOR. Lower-ranking inspector ratings may also be obtained by attending courses organized by institutions duly authorized by CLOR.



Certificates attesting to the completion of required coursework and the earning of radiation safety inspector credentials remain valid for a period of 5 years, after which the qualifications of certified inspectors are verified by conducting re-examinations. In order to bring inspectors up to date on the latest developments in this field and in order to facilitate their preparation for the skills verification exams the CLOR organizes regularly scheduled training seminars.

Within the framework of its regular training programs the CLOR has thus far issued more than 5,300 course completion certificates which qualify inspectors to supervise work with radioactive isotopes.

In conjunction with the system for monitoring radioactive pollutants in the environment (which was discussed at greater length in the previous issue of PRZEGLAD OBRONY CYWILNEJ) the efforts that are being made to supervise the utilization of radioactive substances insure that an effective job is being done to monitor and protect the population and the environment against radiation hazards. A wide-ranging program of research and development work is also making it possible for the protection principles resulting from the latest discoveries in the field of radiological protection to be incorporated into existing monitoring systems.

At this point the reader may well wonder how all this ties in with civil defense.

In today's world the problems of radiological protection unfortunately still must encompass the problems associated with the threat of nuclear war. The problems of the threats posed to the general public as a result of nuclear explosions are still a source of serious misunderstandings. Generally speaking, the public still takes an extremely pessimistic view of its chances for surviving such a enormous nuclear disaster.

In light of the results of scientific research projects and studies conducted by foreign scholars and also in light of the research work that has been done here in Poland it has been shown that there are proper courses of action which can be taken to insure the survival of populations inhabiting large areas of land in which radiological threats arise.

Both in peacetime and in the event of nuclear war the main principles of radiological protection are based on the same scientific principles and on a knowledge of the properties of radiation and its effects on living organisms and the environment. The only distinctions that must be made pertain to the procedures that have to be followed to deal with this threat, that is, these procedures must be adapted to cope with current conditions and the scale of the threat that is posed.

A well-organized, efficient and effective system of peacetime radiological protection can be put to work as an element in a system of defense against radiation hazards in time of war. It is after all true that here in Poland we have access to the services of more than 5,000 radiological protection

inspectors. During the course of their regular training programs they also attend lectures on the problems of radiological protection under wartime conditions. They understand the rules of radiological protection, they know how to use dosimetric apparatuses and they know what kind of actions to take in the event of radiation accidents. Moreover, when we take into account the teams of specialists who are active in the system dedicated to monitoring radioactive contaminants in the environment and, finally, the teams of personnel engaged in research and development work in the area of radiological protection in various institutes and universities we find that we have access to a large contingent of people who can and should take part in preparations for civil defense in time of war.

And it is for this very reason that we should make an effort to familiarize ourselves with the workings of the peacetime radiological protection system and to take greater and more frequent advantage of the knowledge and skills of people working in this field.

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## COMPUTER NETWORK DEVELOPMENT OUTLINED

Warsaw SZKLO I CERAMIKA in Polish No 8-9, Aug-Sep 79 pp 206-212

[Article by Tadeusz Romanowicz of the Glass and Ceramics Institute: "Process of Incorporating Information Science in the Glass and Ceramics Industry"]

[Excerpts] Further development of the computer network in Poland is based on the program for the development of hardware produced in Poland and within the CEMA framework. It should be assumed that hardware of the Uniform System of Electronic Digital Computers [JS EMC] will be produced; on the other hand, the group of microcomputers would have to be based on the all-purpose MERA 200 microcomputers which are based on the INTEL 8080 microcomputers, and the group of SM 03 and SM 04 minicomputers (equivalent to the PDP 11/25 and PDP 11/39), on the SOWO 60 which is to be completed on the basis of the Elektronika 60 processor imported from the USSR by 1980.

The electronic computer network intended for management of the Association of the Glass and Ceramics Industry as a grouping of enterprises is being established on the basis of the specific nature of the glass and ceramics industry structure. The general diagram of the subbranch computer network, in conjunction with the data transmission system provides the following configuration:

1. The Subbranch Computation Center is currently equipped with a R-20 and MERA 306 computer, including a data transmission system. The R-20 computer is expected to be eventually replaced with a R-32 computer, and the MERA 306, with a SM 03 or SM 04 computer.
2. The centers of the combines are equipped with minicomputers of the SM 04 class (or SM 04) for local processing.
3. The centers of the plants are equipped just as the centers of the combines.
4. The centers of the plants are equipped with subscriber stations, PSPD-90 [Program Station for Data Collection and Processing] stations and MERA 200 microcomputers.

A MERA 306 minicomputer adapted to present selected personnel on the screen monitor was installed on the premises of the Association of the Glass and Ceramics Industry.

## R-32 COMPUTER, PROCESSOR PRODUCTION, REMOTE SYSTEMS DISCUSSED

Warsaw PRZEGLAD TECHNICZNY INNOWACJE in Polish No 40, 7 Oct 79 pp 8-9

[Interview with Bronislaw Piwowar by Jozef Sniecinski: "It is Difficult To Survive on Computers"]

[Excerpts] The name of MERA-ELWRO--Wroclaw Electronic Plants--was changed to Center of Computer Systems for Automation and Measurements 3 years ago. An institute having the same name was established at the center. Therefore, there is the question of whether or not this change of the name of a computer production plant, which is well known in Poland and foreign countries, was an indication of being in vogue. "We addressed this question to Engineer Bronislaw Piwowar, who is director of the Institute of Computer Systems for Automation and Measurements and the chief designer of the popular Ryad computers of the Uniform System of Electronic Digital Computers [JS EMC]."

"We have to regard, to a greater extent, the computer as an important component in the complicated process of automatic control of production or management. Therefore, the current name of the plant fully indicates the product type and assortment, and we are producing computers, as we have previously, and are continuing the ODRA and JS EMC computer line--specifically the ODRA 1305 and R-32. This year we are initiating the series production of a communications processor which is a component required in remote processing. We are supplying the Soviet market--for many millions of rubles--with memory devices for "Ryad" minicomputers. We have also initiated the production of terminals and equipment for remote data collection and processing."

"Therefore, how many R-32 computers, for example, could you produce annually?"

"I think it would be 100 computers or slightly more, but we are producing considerably less--approximately one-third of this number."

"The (annual) series of 30 or even fewer computers of the R-32 type is, in my opinion, economically unprofitable, especially if there are no greater opportunities to export them. Therefore, would it not be better, in general, to discontinue this production? Would it not be cheaper to produce what is marketable and to import computers?"

"I do not think so. We encounter such opinions. First, is it necessary for Poland to import annually, let us say, 30 computer systems of the R-32 type? From the dollar zone--certainly not. There are computers in the socialist countries, but it is much cheaper to produce them in Poland.... At this year's JS EMC computer exhibit in Moscow, we displayed a computer system; two "Ryad" computers--R-45 and R-60--installed at the exhibit by means of the Polish communications processor on a conventional telephone line, were remotely operated jointly in real time with our facilities in Wroclaw."

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## MICROELECTRONICS IN THE TECHNOLOGY OF LARGE-SCALE AND VERY-LARGE-SCALE INTEGRATION

Warsaw ELEKTRONIKA in Polish Vol 20 No 2, Feb 79 pp 55-57

KOHLE, EBERHART, Ilmenau Technical College, GDR

[Abstract] The present state of the art in microelectronics is characterized by a degree of scaling  $D = 10^2 - 10^5 \text{ cm}^{-2}$  in monolithic systems. Here the technoeconomic indicators of this technology are reviewed, in relation to discrete semiconductor and electron-tube devices, with emphasis on cost components and cost reduction. Various critical items in the manufacturing process are pinpointed, the main problem being to reduce the density of defects and thus increase the optimum surface area. General trends are illustrated quantitatively on typical systems such as TTL-MSI, an 8-bit p-MOS calculator, a 4K-bit n-MOS random access memory and a 16K-bit MOS random access memory with an inbuilt channel. An appropriately programmed computer is becoming a necessary design and production tool for the realization of projected goals, namely a still higher degree of integration and delivery of custom-tailored systems, by application of the electron-beam scanning process. The article was translated from German and edited by Andrzej Byrka. Figures 2; tables 4; references 7: 3 German, 4 Western.

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## MICROPROCESSORS: ACHIEVEMENTS, PROBLEMS AND OUTLOOK

Warsaw ELEKTRONIKA in Polish Vol 20 No 2, Feb 79 pp 63-65

JANKOWSKI, MAREK T., ROBUS, ANDRZEJ and SZYLLER, JERZY, Institute of Electronic Technology *CEM*, Warsaw

[Abstract] The excellence performance of LSI components in microprocessors has been achieved by improvements in photolithographic technology, the introduction of new technologies and the adaptation of techniques used elsewhere. Outstanding developments include the bipolar I<sup>2</sup>L and several new MOS variants (VMOS, SOS, CMOS and charge-coupled devices), to which must be added the entirely novel bubble memory. Optimization of microprocessors often requires combining of various technologies as, for instance, n-channel MOS (with its HMOS extension) in special-purpose and general-purpose 8-bit and 16-bit microprocessors or p-channel MOS in typical special-purpose 4-bit calculators. As a result of these developments, the architecture of microprocessors has become more modularized, more standardized and also programmably dynamized not only within the central unit but throughout the interface and the peripheral equipment as well. Also the applications of microprocessors have expanded to many commercial and consumer products, as replacement of electromechanical or other electronic devices and, particularly, as an alternative to minicomputers. Despite successful large-scale integration, there still remain problems in the production and the use of microprocessors which essentially require non-conventional solutions and particularly relate to software. The outlook for quality improvement and volume expansion, dictated in recent times by demographic trends, is in the area of special-purpose micro-processor architecture for a better performance combined with a higher resistance to mechanical and climatic factors, for a lower overall cost of not only the microprocessor alone but also its accessories, and for a better adaptation to users' needs. One may very well expect the appearance of multi-processor systems, a new branch of industry, and wide new applications in mobile systems ranging from satellites to passenger cars.

CONSTRUCTION OF SEMICONDUCTOR POWER DEVICES

Warsaw ELEKTRONIKA in Polish Vol 20 No 1, Jan 79 pp 22-25

BANY BOGDAN and TESNY, WOJCIECH, LAMINA Electronic Manufacturing Plant

[Abstract] The construction of semiconductor power diodes and thyristors is reviewed, both the internal and the external one. Soldered mechanical joints inside the case have been replaced by spring mounting or mounting between heat sinks, in order to cope with the higher temperatures in such devices. Flat bases and screw bases are available, as well as pellet assemblies and various radiator assemblies designed for optimum heat conduction and power dissipation. Various power packs with appropriate electrical connections are also available. Figures 6; tables 1; references: 6 Polish.

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## MICROELECTRONICS AS THE DEVELOPMENT BASE FOR ELECTRONIC EQUIPMENT

Warsaw ELEKTRONIKA in Polish Vol 20 No 2, Feb 79 pp 53-54

LANTSOV, A.F., USSR Ministry of the Electronic Industry

[Abstract] Microelectronics must be viewed as the technological base on which further progress in the electronic industry is founded. The trend toward LSI and VLSI continues, with the utilization of such phenomena as the Josephson effect and various optoelectronic effects and of various structures such as cylindrical magnetic domains. The trend in digital semiconductor devices is marked by an increasing number of functions per chip, at a lower cost per function and with a higher reliability. A competition exists here between bipolar and MOS technologies, the former applicable to TTL, TTLS, ECL and both applicable to  $I^2L$  and shift registers. The latest developments in MOS technology are reduced silicon gate, double diffusion, V-groove anisotropic etching, and silicon on sapphire substrate. New manufacturing methods include electron-beam scanning, x-ray lithography, ion implantation and plasmochemical treatment. The trend in analog devices is characterized by miniaturization with a higher precision and a higher stability of operational amplifiers, power supplies and various converters. The article was translated and edited by Lidia Leda.

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UDC 621.392

DESIGN OF MULTIVIBRATORS WITH INTEGRATED OPERATIONAL AMPLIFIERS

Warsaw ELEKTRONIKA in Polish Vol 20 No 1, Jan 79 pp 30-34

SKIBA, CZESLAW and ULBIN, ZENON, Military Engineering Academy

[Abstract] Multivibrators with integrated operational amplifiers differ in both design and performance from transistor multivibrators. Here the performance parameters of such astable and monostable multivibrators are calculated on the basis of their respective equivalent circuits, output voltage characteristics and upper limits on the input voltage. The relations thus derived can be useful for selecting the resistances and the capacitance of a multivibrator circuit based on an available operational amplifier so as to meet stipulated performance requirements. Figures 4; references: 3 Polish.

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UDC 621.318.1

## FERRITE-CORE MAGNETOELASTIC TRANSDUCERS WITH HIGHER MECHANICAL STRENGTH

Warsaw ELEKTRONIKA in Polish Vol 20 No 1, Jan 79 p 29

BIENKOWSKI, ADAM, Warsaw Polytechnical Institute, and KULIKOWSKI, JACEK,  
POLFER Magnetic Materials Manufacturing Plant

[Abstract] Ferrite-core magnetoelastic transducers of a slotted rod or cup construction have found wide use, because of their versatile characteristics and low cost. However, easy fracture is their major drawback. A higher mechanical strength can be attained by combining a higher mold density with a finer grain structure and a greater homogeneity of the material. Here another method of increasing the mechanical strength is described, namely reduction of the undesirable tensile stresses at intercolumnar contacts by insertion of a force transmitting nonmagnetic spacer with a thin plastic underlayer between the core and the ball bearing at each end. The effectiveness of this design has been verified experimentally by optoelastic measurements and mechanical load tests, indicating a resistance to pressures above 100 MPa. The method is very simple and economical, except when cores from high-density molds (95 percent of the theoretical density or higher) require machining. Figures 2; references 9: 6 Polish, 2 Russian, 1 Czechoslovak.

CSO: 2602

UDC 621.319.4

## CHARACTERISTICS OF INTERDIGITAL CAPACITORS AT FREQUENCIES UP TO 1 GHz

Warsaw ELEKTRONIKA in Polish Vol 20 No 3, Mar 79 pp 112-114

POSOBKIEWICZ, JAN and PRZYBYSZ, CZESLAW

[Abstract] Interdigital capacitors were first developed in the United States in 1970 for use in microwave circuits, to provide a wide range of nominal sizes (0.1-10 pF) and to ensure a high precision in terms of narrow tolerances. Here the construction and the technology of such capacitors made in Poland, at the Hybrid Circuits Experimental Production Laboratory in Warsaw, are described. The basic design parameters of CC 24, 25 and CZ 35, 37 capacitors rated from 3 to 5 pF are a surface area of 25-37 mm<sup>2</sup> and clearances of 60-100  $\mu$ m, on Corning grade 7058 glass substrates. The frequency characteristics of their capacitance as well as their loss tangent and impedance were measured and found to remain fairly flat up to 200-500 MHz. Calculations were made on the basis of an equivalent circuit with lumped parameters and, for transients, with a shorted output. The operating frequency range of these capacitors becomes wider as the nominal capacitance decreases. Figures 5; references 9: 6 Polish, 3 Western.

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UDC 621.372.54

## A 10-POLE NARROW-BAND QUARTZ-CRYSTAL FILTER PP-10.7-E

Warsaw ELEKTRONIKA in Polish Vol 20 No 1, Jan 79 pp 13-15

KOMAS, MARIA and MILLER, STANISLAW, OMIG Assembly of Radio Components

[Abstract] A quartz-crystal filter is shown designed for a passband of 3 kHz with the center frequency 10.7 MHz and a corresponding narrow channel separation of 6.25 kHz. A 10-pole network with double-resonance stages in a monolithic execution achieves the required at least 22 dB suppression at  $\pm 2$  kHz away from the center frequency. The bandwidth as well as the attenuation characteristic of this PP-10.7-E filter depend largely on the acoustic coupling coefficient, a parameter most difficult to maintain within tolerances. It is affected by plateback, positioning of electrodes relative to the crystallographic axes with a proper clearance from them, and by the base angle. The effect of manufacturing imprecision on the acoustic coupling coefficient with respect to TT and TS vibrations has been analyzed, so that the filter design could be optimized from the technological standpoint. Figures 9; references: 6 Western.

CSO: 2602

## FORECASTS ABOUT THE DEVELOPMENT OF PASSIVE ELECTRONIC COMPONENTS

Warsaw ELEKTRONIKA in Polish Vol 20 No 3, Mar 79 pp 99-103

SZELOCH, ROMAN, Department of Electronic Technology, Wroclaw Polytechnic Institute

[Abstract] Epiplanar technology has yielded active electronic components and integrated circuits even, paradoxically, more reliable and stable than some passive electronic components. It is thus necessary, in turn, to upgrade the latter with all available scientific and technical means so as not to hold back a compatible further development of both active and passive components needed for the increasingly demanded mass-production of low-cost electronic equipment. Here the results of a forecast of forthcoming developments in passive electronic components is presented and the prerequisites for their success are defined. This forecast has been arrived at by the Delphic method and is based on the "demand" model resulting from a survey of six main user categories (computers and measurement-automation systems, health care equipment, communication equipment, transportation equipment, scientific-research equipment, and household appliances). As trend indicators serve anticipated higher reliability, higher stability of performance parameters, higher resistance to climatic factors, wider range of nominal values, narrower tolerances, and smaller dimensions. The forecast is, furthermore, based on an analysis of the 1976-85 trend worldwide, in CEMA countries and in Poland, also on a projection to 1990 and on the present state of the art. The forecast covers resistors, capacitors, magnetic components, filters, switches, connectors and printed circuits. Problem areas include mainly the choice of materials and technologies, optimization of existing products and innovation. Piezoelectric components are an example of a fast growing product line. Tables 3; references: 7 Polish.

CSO: 2602

## QUALITY CONTROL OF ELECTRONIC COMPONENTS AND MATERIALS

Warsaw ELEKTRONIKA in Polish Vol 20 No 3, Mar 79 pp 103-104

MEDOWSKI, JOZEF, Branch Center of Quality Control and Standardization at the Institute of Telecommunication and Radio Engineering

[Abstract] In order to coordinate the activities and the goals of all UNITRAELEKTRON industrial association member plants with regard to quality control of electronic components and materials, the Institute of Telecommunication and Radio Engineering has established BOSIN (Branch Center of Quality Control and Standardization). Its responsibility is continuous and systematic research and engineering-management as well as supervision of all areas of production and use, which includes originating the product specifications before manufacture begins, qualification testing throughout the production cycle, and certification of the finished products. This will also involve comparative evaluation of the UNITRA-ELEKTRON products relative to analogous products made in other countries and measuring them against foreign standards as well, for trade purposes, also steady updating of production and performance requirements. For a more effective operation, BOSIN has been divided into three departments specializing respectively in semiconductor devices (at MPCP CEMI), in electronic materials (at ONPMP), and in professional electronic equipment and marketing (at CNPEP RADWAR). BOSIN will operate in all these areas by the end of the third quarter of 1979. At the same time, the principles and the organization of IEC (International) certification system will also have been introduced.

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UDC 621.392

## A NEW SYSTEM OF DATA SAMPLING IN REAL TIME

Warsaw ELEKTRONIKA in Polish Vol 20 No 1, Jan 79 pp 16-20

MORAWSKI, JANUSZ, Main Research and Development Center for Research and Instructional Apparatus

[Abstract] The well known principles of signal sampling in real time and in equivalent time are reviewed, instruments for this purpose including the model 180C+7S11+7T11 Tektronix and the model OS 1500 + OS 1530 made in Poland, and some improvements by the author are described. Both methods of signal sampling are analyzed with the aid of schematic block diagrams of the respective instruments and the corresponding sequential signal flow diagrams. The gist of the innovation in real-time sampling is the generation of a staircase voltage at the output of the shaping circuit and controlling with it the horizontal deflection as well as, through a comparator, the pulse generator. This does not affect signal sampling in equivalent time, and at the same time facilitates image shifting in the horizontal direction. This method is found to be simpler and more logical than that implemented in the Tektronix 7T11. Figures 11.

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UDC 621.392

PHASE JITTERS IN DIGITAL MULTIHOP TRANSMISSION SYSTEMS

Warsaw PRZEGLAD KOMUNIKACYJNY in Polish No 1, 1979 pp 20-23

HERMANOWICZ-KORALEWSKA, EWA, Institute of Telecommunication, Gdansk Polytechnic

[Abstract] An analysis is presented of jitter accumulation in multihop tele-, cable and radio transmission systems. A method of optimizing the attenuation coefficient of the PLL filter of a radio link regenerator in relation to jitter accumulation in the multihop link is given. The advantage of the method described is the possibility of its application in designing radio-relay link regenerators. Figures 8; tables 2; references: 2 Czech; 5 Western.

CSO: 2602

UDC 621.394.4

## CHARACTERISTICS OF TGFM TYPE CARRIER TELEGRAPHY EQUIPMENT

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish No 1, 1979 pp 6-13

BULSKI JERZY and PAWLICKI HENRYK, Wielkopolskie [Great Poland] Teleelectronic  
TELKOM-TELETRA Plants imeni Gen. K. Swierczewski

[Abstract] The Wielkopolskie Tele-electronic TELKOM-TELETRA Plants imeni  
Gen. K. Swierczewski have recently started the production of a modern  
TgFM-type carrier telegraphy equipment. The characteristics and application  
of the following components of this equipment are described:

- telegraphic channel,
- TgFM group circuits,
- ETD electronic teleprinter repeaters,
- control and measuring devices,
- feeders and bays used in TgFM and SETD equipment.

2 tables. 14 figures. Figures 16; tables 2.

CSO: 2602

UDC 621.396.11

## INFLUENCE OF CIRCULAR POLARIZATION ON USW FM RECEIVING CONDITIONS

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish No 1, 1979 pp 14-19, 29

BEM DANIEL JOZEF and ZIELINSKI, RYSZARD, Institute of Telecommunication and Acoustics, Warsaw Polytechnic, and HUCHLA, JERZY. Radio and Television Station, Wroclaw

[Abstract] Advantages are discussed of the application of circular polarization to broadcasting programs in the USW range. Experimental field investigations were carried out in order to verify those advantages and the statistical analysis of the results of measurements points to the usefulness of circular polarization because of the increase in the signal level in automobile receivers by about 20 dB, an increase in the signal level in portable receivers by about 15 dB, improvement in the spatial field distribution, independence of reception in the receiving antenna position, and lack of deterioration in the receiving conditions in other cases, provided the power supply of a circularly polarized antenna is doubled. These investigations, however, did not include indoor antennas in apartments, large blocks of buildings, and housing areas. Such investigations are necessary and will be carried out in the near future. Figures 3; references 5: 1 Polish; 4 Western.

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UDC 621.396.96

## LASER RANGING

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish No 1, 1979 pp 1-5

KLEJMAN, HERMAN [Affiliation not given]

[Abstract] A comprehensive review of laser ranging is given. Its principles are explained and its application in space research is described and exemplified by lunar ranging experiments of Apollo 11, Apollo 14, Apollo 15, and Soviet Lunokhods, with the installation of retro-reflectors on the moon, and their location on the moon map is shown. Laser ranging experiments at the McDonald Astronomical Observatory and at the corresponding Soviet installation at the Crimean Astrophysical Observatory of the USSR Academy of Sciences are described and the characteristics of the laser devices used are given. A sketch diagram of the Soviet installation for laser ranging is shown. The use of laser range finders for the observation of artificial earth satellites and their other applications-American, French, Swedish (military range finders), and Polish-are briefly described and illustrated. 10 figures; references: 5 Polish.

CSO: 2602



## CALCULATION OF THE MEAN TIME BETWEEN FAILURES FOR AN ENGINEERING DESIGN PROJECT

Warsaw ELEKTRONIKA in Polish Vol 20 No 1, Jan 79 pp 25-28

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[Abstract] A reliability analysis is required during each of the three stages in any design project: 1) Conceptual; 2) Preliminary, and 3) Engineering. Here a simple procedure is shown for calculating, in the last design stage, the mean time between catastrophic failures of the main functional system in an object. The necessary simplifying assumptions are that no parametric failures occur and that the probability of proper operation has an exponential distribution, i.e., the failure rate remains constant in time. Failures are, furthermore, assumed to be mutually independent random events, with all elements of one type having identical reliability characteristics and all elements operating simultaneously. Given are data from the preceding design stage, the functional schematic diagram of the design object and all its functional components also all the operating conditions including the electrical load and the environmental influencing factors. The general formulas are applied to a specific example in which the results suggest, on the basis of a worst-case analysis, whether or not adding more margin or simplifying the system by reducing the number of elements will become necessary. Figures 1; references 6: 4 Polish; 2 Russian.

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## TYPE-CQ11BP TRANSOPTORS AS KEYBOARD SWITCHES FOR THE MODEL K765 CALCULATOR

Warsaw ELEKTRONIKA in Polish Vol 20 No 3, Mar 79 pp 117-118

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[Abstract] A keyboard has been designed for the model K765 calculator (equivalent to the Commodore Business Machines model 897D). It uses transoptors as switches, instead of bipolar transistors, so that the MOS structure becomes isolated from the TTL circuits and neither inputs nor outputs have to be matched, only the potentials where hookup is to be made. It also contains fewer components than a transistor keyboard and, as a consequence, the power supply circuit can be simplified. Transoptor switches can, furthermore, be easily controlled with an NAND gate or an open-collector negator circuit with the possibility of logic addition of signals. As a self-contained unit, such a keyboard is adaptable to similar other calculator models. The major problem with production of this keyboard is the momentary scarcity and high cost of transoptors on the domestic market. Figures 2; references: 1 Polish.

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EVALUATION OF VACUUM DEPOSITION METHODS USED FOR PRODUCTION OF THIN FILMS  
OF SEMICONDUCTOR COMPOUNDS

Warsaw ELEKTRONIKA in Polish Vol 20 No 3, Mar 79 pp 105-111

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[Abstract] A systematic review of vacuum deposition technology is presented, as it applies to thin films of semiconductor compounds. Altogether 11 different methods are compared with respect to basic process ingredients (form of raw material, impurities, doping, condensation, heat treatment, masking, process conditions) as well as processing equipment, product quality and inspection (crystal structure, chemical composition, film thickness, electrical and optical properties), and production economy. Single-source thermal vapor deposition, 2-source molecular bonding, and the 3-temperature process are found to be the best methods for thin films of uniform chemical composition, while the EDRI (isothermal) method is found to be best for thin films with a composition gradient. Tables 2; references: 2 Polish.

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